

REMARKS

Applicants respectfully request reconsideration of this application, and reconsideration of the Office Action dated June 21, 2005. Upon entry of this Amendment, claims 1 and 3-22 will remain pending in this application. The amendments to the claims are supported by the specification and original claims. No new matter is incorporated by this Amendment.

Applicants again gratefully acknowledge the Examiner's express indication that claims 11-20 and 22 are allowed.

* * * * *

Claims 1, 3, 4, 6, 7, 10, and 21 are rejected under 35 U.S.C. §103(a) as purportedly obvious based on Kimoto et al. (JP 2002-067372) in view of Suzuki (JP 2003-182152). Applicants respectfully traverse.

As an initial matter, Applicants submit that it seems that this rejection relies on English versions of Kimoto (JP 2002-067372) and Suzuki (JP 2003-182152) translated by a Japanese Patent and Trademark Office computer. Thus, since the reliability of such translations are deemed to be doubtful, Applicants have summarized the inventions of Kimoto and Suzuki in the attached documents labeled "Applicants' Summary of Teachings of Kimoto" and Applicants' Summary of Teachings of Suzuki".

Independent claim 1 (from which claims 3-10 depend) concerns an LED array exposure device. Independent claim 21 concerns a corresponding method. According to the device of claim 1, an average value is obtained by averaging beam spot areas of the recited plurality of light-emitting elements, including the specially recited light-emitting element "for which correction is performed". A difference is obtained by subtracting the beam spot area of the (special) light-emitting element from the average value of the beam spot areas. Claim 1 continues that ratio of the difference is obtained by dividing the difference by the average value of the beam spot areas. A beam spot area correction coefficient for the special light-emitting element is calculated in accordance with the ratio

of the difference. Also, a granularity correction coefficient for reducing granularity is calculated in accordance with the magnitude of a parameter that affects granularity in an image. Finally, the driving current for the special light-emitting element is obtained by multiplying the standard driving current by (i) the light quantity correction coefficient, (ii) the beam spot area correction coefficient, and (iii) the granularity correction coefficient.

Having the above described arrangement, the claimed invention achieves an LED array corrected for images with linear density changes and significantly reduced, uneven densities or streaks appearing in the image. Applicants' arrangement even compensates where the beam spot area for each light-emitting element of the LED array varies.

By contrast, Suzuki suggests an inspection method. According to Suzuki, an LED array is rejected if the average beam spot area or the average beam spot diameter is greater than a predetermined value (or if a ratio of a difference between a group average beam spot area and an overall average beam spot area to the overall average beam spot area is greater than a predetermined value). Otherwise, the LED array is judged to be usable. Suzuki's invention results in an image forming apparatus that forms an image having good linearity and clarity from vertical lines by using such selected LED arrays with small variations. Suzuki does not teach or suggest compensating an LED array having variations by performing corrections for beam spot area and for granularity parameters at the same time. Suzuki does not disclose a correction method to make such an LED array usable.

One of ordinary skill in the art would not have been motivated to have combined Suzuki's inspection method with Kimoto. Kimoto discloses a correction method for an LED array, not selection of LED arrays according to some standard. Hence, Applicants respectfully urge that the asserted combination of Suzuki with Kimoto is untenable as it improperly relies upon hindsight. The rejection therefore must fail.

Even if the teachings of Kimoto and Suzuki properly were combinable, the correction method disclosed by Kimoto would not be improved so as to lead to the

claimed invention. Suzuki fails to remedy the deficiencies of Kimoto in teaching each and every feature of the claims. For example, Kimoto and Suzuki fail to teach or suggest a device wherein "a difference is obtained by subtracting a beam spot area of the light-emitting element from the average value of the beam spot areas; a ratio of the difference is obtained by dividing the difference by the average value of the beam spot areas; and a beam spot area correction coefficient for the light-emitting element is calculated in accordance with the ratio of the difference." This is understood from the attached summarized embodiment examples of Kimoto and Suzuki.

Kimoto and Suzuki also fail to teach or suggest Applicants' arrangement adjusting driving current to take into account the magnitude of a parameter that affects granularity in an image. According to Paragraph 0010 of his specification, Kimoto discloses that "because the sensitivity (threshold value L_{th}) of the photosensitive drum changes, the influence by the light intensity distribution of the LED element and by the rod lens array 13 being out of focus is intensified, which varies the dot sizes". From these comments, those of ordinary skill in the art would conclude that the sensitivity of the photosensitive drum disclosed by Kimoto depends on parameters different from those which affect granularity (as described in the specification of the present invention). Per Applicants' specification, for example, granularity becomes worse at a larger screen angle, and better at a smaller screen angle. Applicants make the correction for this in their driving current. Kimoto does not. According to their claimed invention, Applicants calculate a granularity correction coefficient (for reducing image granularity) based on the magnitude of one or more parameters that affect image granularity, and then control the driving current by multiplying the standard driving current by their calculated granularity correction coefficient. Such is not taught or suggested by either Suzuki or Kimoto.

In view of the above remarks, Applicants submit this rejection is overcome and request it be withdrawn.

* * *

Claim 5 is rejected under 35 U.S.C. §103(a) as purportedly obvious based on Kimoto et al. in view of Suzuki, and further in view of Rushing et al. (U.S. Patent. 5,933,682).

Claim 8 is rejected under 35 U.S.C. §103(a) as purportedly obvious based on Kimoto et al. in view of Suzuki, and further in view of Manzer et al. (U.S. Patent. 5,124,732).

Claim 9 is rejected under 35 U.S.C. §103(a) as purportedly obvious based on Kimoto et al. in view of Suzuki, and further in view of Yamada et al. (U.S. Patent. 5,463,473).

These three rejections are addressed together as similar issues apply to all three. Moreover, Applicants respectfully traverse each.

The deficiencies of Kimoto and Suzuki are discussed above. None of the other cited secondary documents remedies these deficiencies. None of the cited patents teaches or fairly suggests a device wherein "a difference is obtained by subtracting a beam spot area of the light-emitting element from the average value of the beam spot areas; a ratio of the difference is obtained by dividing the difference by the average value of the beam spot areas; and a beam spot area correction coefficient for the light-emitting element is calculated in accordance with the ratio of the difference" as recited in the present claims. None of the documents teaches or suggests such a device or method where adjustment also is made for granularity in the manner done by Applicants. Moreover, there is nothing in the teachings of the cited patents which would motivate those of ordinary skill in the art to have employed these features.

In view of the above remarks, Applicant submits each of the above rejections is overcome. Withdrawal of each is thus respectfully requested.

* * * * *

Applicants respectfully submit that this Amendment and the above remarks obviate the outstanding rejections in this case, thereby placing the application in condition for immediate allowance. Allowance of this application is earnestly solicited.


If any fees under 37 C.F.R. §§1.16 or 1.17 are due in connection with this filing, please charge the fees to Deposit Account No. 02-4300; Order No. 032739.089.

If an extension of time under 37 C.F.R. §1.136 is necessary that is not accounted for in the papers filed herewith, such an extension is requested. The extension fee should be charged to Deposit Account No. 02-4300; Order No. 032739.089.

Respectfully submitted;

SMITH, GAMBRELL & RUSSELL, LLP

By:


Michael A. Makuch, Reg. No. 32,263
1850 M Street, N.W., Suite 800
Washington, D.C. 20036
Telephone: (202)263-4300
Facsimile: (202) 263-4329

Dated: September 21, 2005
MAM/BLN